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Minerals have multiple uses. They are often connected to global commodity chains, travelling around the world several times. In contrast, mining waste rarely travels far, much like the dust that miners excavate and breathe underground. Often, these residues remain with the mining communities that contributed to their material production. And they accumulate in the environment and human bodies. The Rand mines in South Africa are estimated to have produced more than a third of all the gold ever extracted in the world. On average, it takes a ton of rock to extract 10 grams of gold. From this, one can easily understand the extent of waste production from South African mines, of their volumetric violence on humans and non-humans. The presence of radioactive and toxic materials within this waste also makes clear their long-term threat – first of all, for those who live around or even on top of them, but also for those who think they are distant and immune from this type of problem, who might be sitting comfortably in an urban house made of radioactive bricks.

Gabrielle Hecht's book, *Residual Governance*, is interested in what remains of mining operations and the management of their residues, and in the technopolitics necessary for the production of minerals, such as gold and uranium, as well as in hiding their cumbersome waste. She tackles this topic by focusing precisely on the meanings of 'residual', reminding us that, at the foundation of every social and political structure, of every social contract – however abstract it may appear – there is always a specific material reality, from physical infrastructures to policies to knowledge, that supports it. To understand South African mining capitalism, one cannot fail to consider the particular technopolitics that the philosopher Charles Mills defines as the 'racial contract'.

At the foundation of liberal democracies and its economic forms, there is not, in fact, the abstract fraternal equality between peoples evoked and promised by Enlightenment humanism, but rather racial hierarchies that separate and exclude portions of humanity, residues of humanity that become, precisely, 'wasted lives' – to use an expression of the sociologist Zygmunt Bauman. In South Africa, mining residues, as Hecht underlines, are an expression of the racial contract that took shape because of the way in which the mining industry has made profits over time; they make visible the white reality of the social organization of racial capitalism. Here, in South Africa, apartheid continues to slowly reproduce its effects even though it officially ended three decades ago. It continues to be a problem – a 'wicked problem' or even a 'super-wicked problem' – despite the fact that these effects have been studied by many scholars and are not very difficult to see. 'You can see apartheid from space' is the title of one of the chapters; it echoes like a response, clearing the field of any possible denialist temptation. Why then do 'the residues of mining pose such a persistent problem?' Hecht asks (p. 6). This is a crucial question addressed by the author not only to explain the recent past and present of the communities living on the Rand, but also to think about the planetary futures announced by 'waste stories'.

Hecht's book continuously zooms in and out between individual micro-stories and collective macro-stories, following a narrative line that, from chapter to chapter, 'loops and spirals through time' (p. 7). This narrative line is intertwined with images: among the many included in the book are photographs of miners from below and photographs of mines from above, some of which were taken by South African artists, but also maps from space and graphs. These highlight the author's efforts to establish bridges between science, art and activism. Hecht does not propose yet another

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attempt to do collaborative research with communities directly affected by social injustice and environmental violence. Very honestly, she recognizes that others have already done this work and know how to do it better. In some respects, this book is a metadiscourse on public commitment, one that does not fall into the intellectualistic temptation of spectatorship. On the contrary, on several occasions, Hecht breaks the 'fourth wall' and addresses the reader directly to ask them to do 'mental exercises' that bring them into the historical and concrete reality of inhabitants of the Rand.

Residual Governance is therefore also public history at its best. It tackles a central question head on: how to transform knowledge into action knowing that knowledge is imprecise, incomplete, inadequate but, above all, manipulable. How to make knowledge actionable, knowing that more knowledge does not necessarily translate into greater awareness and desire for change.

Knowledge – even when presented as 'scientific' – can confuse or fuel doubts that paralyze action instead of activating it. This is well demonstrated by some of the situations described in Chapter 4, 'South Africa's Chernobyl?' Hecht shows the efforts and battles of environmentalists to deal with attempts by mining companies to neutralize their protests and people's anger by spreading doubts cloaked in the rhetoric of scientific evidence. But there is also science and knowledge in the life experiences of people – no less grounded than 'scientific evidence' – people who know first-hand the harmful effects of slow violence. Social scientists can recover these experiences with theoretical tools capable of grasping complexity at multiple scales and levels, which involve differently positioned social actors.

As Hecht shows, the conceptual repertoire available to scholars and activists is rich and increasingly sophisticated. And this book certainly makes a fundamental contribution to these efforts and to contemporary debates on the Anthropocene, which is understood here as an 'apotheosis of human-generated waste' (p. 27). However, this makes even more deafening a fundamental question that perhaps a single book alone cannot answer: what prevents change towards a more just (and 'sustainable') world?

The book begins by evoking a crucial event in South Africa's recent history: the 1976 student protest in Soweto, bloodily repressed by the police – for some, the beginning of the end of apartheid, for others only the beginning of an end yet to be written. Why do socio-environmental issues today not produce action proportionate to the global gravity of the situation? If it doesn't fully happen in South Africa, which Hecht represents as a laboratory for the future, what hope does the rest of the world have? Must we resign ourselves to the idea of living in the 'ruins of capitalism',[1] of 'staying with the trouble',[2] and prepare ourselves and the next generations for contaminated existences? For sure, there is still much work to do in building bridges and establishing alliances between scientists, artists and activists. Not to mention the (possible?) alliances between communities experiencing similar conditions in different parts of the world. Unlike in *Being Nuclear*,[3] Hecht here does not embrace the same transnational perspective that had pushed her to connect different stories from across the continent, from Gabon to

[1] A. L. Tsing (2017) *The Mushroom at the End of the World: on the possibility of life in capitalist ruins*. Princeton NJ: Princeton University Press.

[2] D. J. Haraway (2016) *Staying with the Trouble: making kin in the Chthulucene*. Durham NC: Duke University Press.

[3] G. Hecht (2012) *Being Nuclear: Africans and the global uranium trade*. Cambridge MA: MIT Press.

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Madagascar. But isn't such a perspective necessary here too, perhaps even more so, if it is true that the residues of mining represent a planetary crisis?

This book, incredibly rich in profound analysis, is an invitation to complex thinking, and, as such, should be read and read again from different angles, with the certainty of discovering new insights each time.

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This book has been written in honest anger, with stunning vehemence and exquisite one-liners. In *Residual Governance*, Hecht demonstrates that, although formal apartheid may have ended and industrial deep-level gold mining along the Witwatersrand has been stuttering to an end since 1994, the social and environmental destruction wrought by mining within the context of racial capitalism in South Africa continues unabated. Indeed, if anything, the destruction has only worsened and is set to degrade further in the future. In five substantive chapters, Hecht illustrates the pernicious long-term effects of industrial mining and its implications for the planet as a whole. Hecht does not see South Africa in isolation; instead, she argues that South Africa should be seen as a portent for the rest of the world and its future.

Hecht's work is a call to action, one that is based on empirical data and solid political analysis. Drawing on Charles Mills, Hecht calls attention to the racial contract that underlies the technopolitical project that is South Africa in the present. Taking the waste that is generated by industrial mining in South Africa as a focal point, Hecht is able to: (1) explain and illustrate the mechanisms of systemic and epistemic racism; (2) make clear the infrastructural and environmental expressions of racial capitalism; and (3) describe the 'nature and stakes of political struggle in the Anthropocene' (p. 5). To demonstrate this, Hecht develops and deploys the concept of residual governance, which in essence entails governance that treats 'people and places as waste and wasteland' (p. 6).

The consummate opening of Chapter 1, 'You can see apartheid from space', with its innovative and intelligent use of Google Earth, makes it ideal for teaching. One can almost see the 'aha moment' of understanding emerge on the faces of a class of students as they come to realize the implications of political decisions that placed townships for Black South Africans downwind of the toxic mine dumps of the Witwatersrand. Toxic mine dumps are laden with radioactive material and caustic chemical compounds that are swept into the wind and blown across townships, inhabitants of which are 'eternally aware of the sand in the machine, they suffer the daily effects of the grind' (p. 23). For me, Chapter 2, 'The hollow Rand', was a true hammer blow. The chapter focuses on water rising in abandoned mineshafts, thereby becoming more acidic and contaminated with heavy metals, later 'decanting' into the water used for drinking and irrigation. What makes this all the more disconcerting is that it is set to get worse as mines cease operating. Added to which, 'corporate shuffling [has] enabled the largest companies to walk away from the messes they'd made' (p. 68). Chapter 3, 'The inside-out Rand', focuses on the truly staggering amount of dust

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